## HALO PHENOMENA OBSERVED DURING SEPTEMBER, 1918.

By WILLIS RAY GREGG, Meteorologist.

| Station. | Altitude. | Latitude. | Longitude. | Date. | Form observed. | Time of— | | Theodolite readings. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Beginning. | Ending. | Time. | Radius inside. | Radius outside. | Length of arc. | Distance from sun or moon. | Altitude of sun or moon. |
| | m. | ° ′ | ° ′ | | | | | | ° | ° | ° | ° | ° |
| *Broken Arrow, Okla. | 233 | 36 02 | 95 49 | 11 | Solar halo, 22° | 9:35 a. m. | 5:25 p. m. | 1:46 p. m. | 22.5 | 23 | 360 | | 52.5 |
| | | | | 11 | Lunar halo, 22° | 7:15 p. m. | 8:00 p. m. | | | | | | |
| | | | | 13 | Solar halo, 22° | 6:25 a. m. | 7:45 a. m. | 7:15 a. m. | 22 | 22.5 | | | 14.5 |
| | | | | 13 | Parhelion, 22°, right. | 6:25 a. m. | 7:00 a. m. | | | | | | |
| | | | | 13 | Parhelion, 22°, left. | 6:25 a. m. | 7:00 a. m. | | | | | | |
| | | | | 13 | Upper tangent arc. | 7:30 a. m. | 7:40 a. m. | | | | | | |
| Canton, N. Y. | 137 | 44 36 | 75 10 | 6 | Solar halo, 22° | 5:35 p. m. | 5:55 p. m. | | | | | | |
| | | | | 7 | Solar halo, 22° | 7:50 a. m. | 10:00 a. m. | | | | | | |
| | | | | 11 | Solar halo, 22° | 3:00 p. m. | | | | | | | |
| | | | | 18 | Solar halo, 22° | 7:50 a. m. | 8:35 a. m. | | | | | | |
| | | | | 25 | Solar halo, 22° | 8:05 a. m. | 9:00 a. m. | | | | | | |
| Cincinnati, Ohio. | 191 | 39 06 | 84 30 | 2 | Solar halo, 22° | 10:30 a. m. | 11:40 a. m. | | | | | | |
| | | | | 26 | Solar halo, 22° | 10:00 a. m. | 4:40 p. m. | | | | | | |
| Dayton, Ohio. | 274 | 39 46 | 84 10 | 2 | Solar halo, 22° | 6:00 a. m. | 11:30 a. m. | | | | | | |
| | | | | 2 | Solar halo, 46° | 6:40 a. m. | 7:10 a. m. | | | | | | |
| | | | | 25 | Solar halo, 22° | 11:45 a. m. | 12:10 p. m. | | | | | | |
| | | | | 26 | Solar halo, 22° | 9:45 a. m. | 11:40 a. m. | | | | | | |
| *Drexel, Nebr. | 396 | 41 20 | 96 16 | 1 | Solar halo, 22° | 8:42 a. m. | 1:12 p. m. | 8:42 a. m. | 22 | 23 | 360 | | 32 |
| | | | | 17 | Solar halo, 22° | 10:45 a. m. | 12:03 p. m. | 11:00 a. m. | 22 | 22.5 | 360 | | 47 |
| | | | | 23 | Solar halo, 22° | 11:59 a. m. | 1:30 p. m. | 12:01 p. m. | 22 | 22.5 | 90 | | 48 |
| | | | | 24 | Solar halo, 22° | 8:31 a. m. | 9:00 a. m. | 8:15 a. m. | 22 | 22.5 | 180 | | 20 |
| | | | | 25 | Parhelion, 22°, right. | 8:30 a. m. | 10:10 a. m. | 8:35 a. m. | | | | 27 | 24 |
| | | | | 25 | Parhelion, 22°, right. | | | 9:55 a. m. | | | | 33.5 | 36 |
| | | | | 25 | Parhelion, 22°, left. | 9:45 a. m. | 10:10 a. m. | 9:55 a. m. | | | | 33.5 | 36 |
| | | | | 25 | Circumzenithal arc. | 7:45 a. m. | 8:30 a. m. | 8:15 a. m. | 23.5 | 24.5 | 40 | 46 | 20 |
| | | | | 25 | Parhelic circle. | 9:45 a. m. | 10:10 a. m. | 9:55 a. m. | | | 77 | | 36 |
| *Ellendale, N. Dak. | 444 | 45 59 | 98 34 | 14 | Solar halo, 22° | 7:15 a. m. | 8:10 a. m. | 7:22 a. m. | 22 | 23 | 100 | | 13 |
| *Groesbeck, Tex. | 141 | 31 30 | 96 28 | 3 | Solar halo, 22° | 10:14 a. m. | 10:26 a. m. | 10:22 a. m. | 20 | 22 | | | 52 |
| | | | | 11 | Solar halo, 22° | 11:15 a. m. | 4:13 p. m. | 11:27 a. m. | 21.1 | 22 | 315 | | 60 |
| *Leesburg, Ga. | 85 | 31 47 | 84 14 | 12 | Lunar halo, 22° | 6:42 p. m. | 7:25 p. m. | | | | | | |
| Madison, Wis. | 297 | 43 05 | 89 23 | 1 | Solar halo, 22° | 5:20 p. m. | | | | | | | |
| | | | | 13 | Solar halo, 22° | 9:05 a. m. | 10:00 a. m. | | | | | | |
| | | | | 23 | Solar halo, 22° | 5:00 p. m. | Sunset | | | | | | |
| | | | | 24 | Solar halo, 22° | 12:00 m. | 1:30 p. m. | | | | | | |
| | | | | 24 | Circumscribed halo. | 12:00 m. | 1:30 p. m. | | | | | | |
| Nashville, Tenn. | 166 | 36 10 | 86 47 | 4 | Solar halo, 22° | 11:50 a. m. | 12:05 p. m. | | | | | | |
| | | | | 27 | Circumscribed halo. | 11:05 a. m. | 1:00 p. m. | | | | | | |
| | | | | 28 | Solar halo, 22° | 10:00 a. m. | 10:10 a. m. | | | | | | |
| *Royal Center, Ind. | 225 | 40 53 | 86 29 | None. | | | | | | | | | |

* Aerological station.

HALO PHENOMENA OBSERVED DURING SEPTEMBER, 1918.

| Station. | Date. | Colors.† | Degree of brightness. | Clouds. | | | Station pressure. | Precipitation. | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Amount. | Kind. | Dir. | | Last previous ended. | First subsequent began. |
| *Broken Arrow, Okla. | 11 | R. | Bright | 9 | Ci. St. | w. | Falling | 10:00 a. m., 6th. | 6:57 a. m., 15th. |
| | | | | 4 | Ci. St. | nw. | | | |
| | 11 | R. | Dim | 3 | A. st. | nw. | Stationary | 10.00 a. m., 6th. | 6:57 a. m., 15th. |
| | 13 | Y. | Dim | 8 | Ci. st. | n. | Rising | 10:00 a. m., 6th. | 6:57 a. m., 15th. |
| | 13 | | Dim | | | | | | |
| | 13 | | Dim | | | | | | |
| | 13 | | Dim | | | | | | |
| Canton, N. Y. | 6 | R. G. | Dim | 1 | Ci. st. | w. | Rising | 8:00 a. m., 6th. | D. N., a., 10th. |
| | | | | 7 | A. st. | w. | | | |
| | 7 | | Bright | 1 | Ci. | w. | Rising | D. N., p., 6th. | D. N., a., 10th. |
| | | | | 3 | Ci. st. | w. | | | |
| | 11 | O. G. | Dim | 1 | Ci. st. | w. | Falling | D. N., a., 10th. | 9:30 p. m., 11th. |
| | | | | 6 | A. st. | w. | | | |
| | 18 | | Dim | 1 | Ci. st. | w. | Falling | —p. m., 17th. | 1:00 p. m., 18th. |
| | 25 | | Dim | 1 | Ci. st. | w. | Falling | 8:45 a. m., 24th. | 8:01 p. m., 25th. |
| Cincinnati, Ohio | 2 | R. O. Y. G. V. | Dim | 6 | Ci. st. | w. | Falling | 8:45 a. m., 31st. | 2:35 p. m., 2d. |
| | 26 | R. O. Y. G. V. | Bright | 8 | Ci. st. | sw. | Rising | 9:10 p. m., 19th. | 7:55 p. m., 30th. |
| Dayton, Ohio | 2 | R. | Bright | 8 | Ci. st. | w. | Falling | 9:15 a. m., 31st. | 6:20 p. m., 2d. |
| | 2 | R. | Bright | | | | | | |
| | 25 | | Dim | 5 | Ci. st. | w. | Falling | 11:15 a. m., 21st. | 5:20 p. m., 30th. |
| | 26 | | Dim | 7 | Ci. st. | w. | Rising | 11:15 a. m., 21st. | 5:20 p. m., 30th. |
| *Drexel, Nebr. | 1 | R. | Bright | 7 | Ci. | wnw. | Falling | 9:58 a. m., 30th. | 4:57 p. m., 1st. |
| | 17 | R. O. B. | Dim | 7 | Ci. st. | w. | Falling | 6:18 a. m., 15th. | 1:41 p. m., 17th. |
| | 23 | R. B. | Bright | 3 | Ci. | wsw. | Falling | 7:20 p. m., 18th. | 2:35 p. m., 24th. |
| | | | | 4 | Ci. st. | wsw. | | | |
| | 24 | R. O. Y. G. B. | Dim | 8 | Ci. st. | sw. | Falling | 7:20 p. m., 18th. | 2:35 p. m., 24th. |
| | 25 | R. O. Y. G. B. | Bright | 5 | Ci. st. | wsw. | Rising | 7:20 a. m., 25th. | 1:30 p. m., 25th. |
| | 25 | | | | | | | | |
| | 25 | R. O. Y. G. B. | Bright | | | | | | |
| | 25 | R. O. Y. G. B. | Bright | | | | | | |
| | 25 | W. | Dim | | | | | | |
| *Ellendale, N. Dak. | 14 | R. | Bright | 3 | Ci. st. | wnw. | Falling | 2:50 p. m., 6th. | 4:30 p. m., 14th. |
| | | | | 5 | A. st. | wnw. | | | |
| *Groesbeck, Tex. | 3 | O. Y. G. B. | Dim | 3 | Ci. | n. | Falling | 11:14 a. m., 31st. | 9:02 a. m., 4th. |
| | 11 | R. O. Y. G. B. V. | Brilliant | 7 | Ci. st. | ne. | Falling | D. N., a., 6th. | 2:44 p. m., 19th. |
| *Leesburg, Ga. | 12 | | Dim | 4 | Ci. st. | n. | Rising | 10:30 a. m., 8th. | 11:50 a. m., 20th. |
| Madison, Wis. | 1 | R. | Dim | 8 | Ci. st. | w. | Stationary | 5:30 p. m., 30th. | 9:15 a. m., 2d. |
| | 13 | R. | Brilliant | 8 | Ci. st. | nw. | Stationary | 9:00 a. m., 12th. | 6:43 a. m., 14th. |
| | | | | Few. | Ci. Cu. | nw. | | | |
| | 23 | R. | Dim | 10 | Ci. st. | nw. | Stationary | 8:25 a. m., 19th. | 2:00 p. m., 29th. |
| | 24 | | Brilliant | 5 | Ci. st. | w. | Falling | 8:25 a. m., 19th. | 2:00 p. m., 29th. |
| | 24 | | Brilliant | | | | | | |
| Nashville, Tenn. | 4 | | Dim | 5 | Ci. st. | w. | Falling | 7:15 p. m., 3d. | 1:30 p. m., 4th. |
| | 27 | O. B. | Bright | 5 | Ci. st. | 0 | Falling | 7:40 p. m., 26th. | |
| | 28 | | Dim | 10 | Ci. st. | 0 | Falling | 7:40 p. m., 26th. | |
| *Royal Center, Ind. | None. | | | | | | | | |

* Aerological station. †Beginning with part nearest sun or moon: R., red; O., orange, etc.

## CAPT. SCHROEDER ESTABLISHES WORLD ALTITUDE RECORD.

[Abstract from Aerial Age Weekly, New York, Oct. 14, 1918, vol. 8, no. 5, p. 224.]

The Contest Committee of the Aero Club of America has homologated the world's altitude record made by Capt. R. W. Schroeder, in a Bristol fighter equipped with 300-horsepower Hispano-Suiza motor, of 28,900 feet (8,809 m.) above sea level, during a flight on September 18, 1918, at Wilbur Wright Field, Fairfield (near Dayton), Ohio.

Nothing was more fitting. While the allies' aviators overseas are beating the Germans on the various fronts, an American aviator, Capt. R. W. Schroeder, United States Air Service, beats the German aeroplane altitude record.

Capt. Schroeder left the ground at 1:45 p. m., September 18, 1918, and reached his highest point in 105 minutes, which would have been at about 3:30 p. m. It took him about 20 minutes to descend, landing about 200 miles from where he started, at about 3:50 p. m.

Capt. Schroeder is in charge of all performance tests at the Wilbur Wright Station and his duties require him to go to 21,000 and 22,000 feet quite often, and he generally goes without oxygen. In this record climb, he got along well up to 25,000 feet without oxygen. He used no antifreezing mixture and his maximum water temperature was 85° C. at the start and minimum 60° C. at the highest altitude. The temperature of the air was −32° C. (241° A.).

The reports, including the two barograph charts,[1] duly calibrated and corrected, the performance curves, and the temperature record were certified to by Lieut. George B. Patterson, O. I. C. Performance Tests Reports, and the instruments were calibrated by the Bureau of Standards, and adjusted locally at the McCook Field Laboratory and personally installed on the aeroplane by Lieut. Patterson.

The previous American altitude record was made by Caleb Bragg at Mineola, L. I., September 20, 1917, in a Wright-Martin, Model V machine, when he reached the altitude of 20,250 feet, and the last world's record of the International Aeronautic Federation made by G. Legagneux in France on December 28, 1913, was 6,120 meters (20,258 feet). In July, 1914, a German aviator was reported as having flown to 26,200 feet, but the record was never submitted for homologation.

This world's record, made by Capt. Ruddy W. Schroeder, is the first world's aeroplane altitude record held by an American since the world's altitude record made by Lincoln Beachey, at Chicago, Ill., during the international meet, August 20, 1911, when he reached the height of 11,642 feet (3,548 meters).

[1] These are reproduced in Aerial Age Weekly for October 21, 1918, p. 314, and indicate an atmospheric pressure of close to 10 inches, or only slightly more than one-third the surface pressure.—ED.